What is claimed is:

1. A porous ceramic solid support for use in solid phase synthesis of molecules comprising ceramic particles, wherein said ceramic particles comprise a ceramic surface material having exterior and interior surfaces, and pores which permeate the interior of the ceramic particles, and wherein said ceramic surface material is derivatized with one or more chemical functionalities.

2. A porous ceramic solid support for use in solid phase synthesis of molecules comprising pore-filled ceramic particles, wherein said pore-filled ceramic particles comprise a ceramic surface material having exterior and interior surfaces, and pores which permeate the interior of the ceramic particles which are substantially filled with a three-dimensional polymer network, and wherein said three-dimensional polymer network is derivatized with one or more chemical functionalities.

3. The porous ceramic solid support of Claim 1 or Claim 2, wherein said ceramic surface material is coated with a polymer to provide desired surface properties.

4. The porous ceramic solid support of Claim 1 or Claim 2, wherein the ceramic surface material is selected from the group consisting of alumina, alumina silicate, aluminium oxide, aluminium nitride, berrylia, barium titanate, fused silica, silicon carbide, silicon nitride, boron nitride, boron carbide, silicon or boron carbonitride, titanium, titanium oxide, titanium boride, titanium carbide, hafnium, hafnium oxide, cerium, cerium oxide, zirconium, zirconium oxide, yttrium, yttrium oxide, zirconia-toughened alumina, and mixtures thereof.

5. The porous ceramic solid support of Claim 4, wherein the ceramic surface material is a mixture selected from the group consisting of zirconium oxide and cerium oxide, zirconium oxide and hafnium oxide, and zirconium oxide and yttrium oxide.

6. The porous ceramic solid support of any one of Claims 1, 2, or 4, wherein said chemical functionalities are selected from the group consisting of aromatic moieties, heteroaromatic moieties, amine, protected amine, carbonyl, carboxyl, activated carboxyl, hydroxyl, epoxide, anhydride, thiol, and carboxamido.

7. The porous ceramic solid support of Claim 1 or Claim 2, wherein said porous ceramic solid support provides at least about 0.1 mequiv of reactive sites per gram of ceramic particles.

8. The porous ceramic solid support of Claim 7, wherein said porous ceramic solid support provides at least about 0.3 mequiv of reactive sites per gram of ceramic particles.

9. The porous ceramic solid support of Claim 8, wherein said porous ceramic solid support provides at least about 0.5 mequiv of reactive sites per gram of ceramic particles.

10. The porous ceramic solid support of Claim 9, wherein said porous ceramic solid support provides at least about 1.0 mequiv of reactive sites per gram of ceramic particles.

11. The porous ceramic solid support of Claim 1 or Claim 2, wherein the ceramic particles have an initial average particle size ranging from about 5 μm to about 3 mm.

12. The porous ceramic solid support of Claim 11, wherein the initial average particle size is from about 10 μm to about 1 mm.

13. The porous ceramic solid support of Claim 1 or Claim 2, wherein the ceramic particles have an initial pore size ranging from about 40 Angstroms to about 6000 Angstroms.

14. The porous ceramic solid support of Claim 2, wherein the pore-filled ceramic particles have an initial pore size ranging from about 500 Angstroms to about 3000 Angstroms.

15. The porous ceramic solid support of Claim 14, wherein the initial pore size is from about 800 Angstroms to about 1500 Angstroms.

16. A method for solid phase synthesis of molecules using a porous ceramic solid support comprising the steps of:

(a) derivatizing ceramic surface material of said porous ceramic solid support with one or more chemical functionalities which permit attachment of an organic molecule to said ceramic surface material;

(b) attaching said organic molecule to the ceramic surface material; and

(c) subjecting the organic molecule to reactions which result in synthesis of said molecules.

17. A method for solid phase synthesis of molecules using a porous ceramic solid support, wherein said porous ceramic solid support comprises pore-filled ceramic particles, comprising the steps of:

(a) derivatizing a three-dimensional polymer network within interior channels of said pore-filled ceramic particles with one or more chemical functionalities which permit attachment of an organic molecule to said three-dimensional polymer network;

(b) attaching said organic molecule to the three-dimensional polymer network; and

(c) subjecting the organic molecule to reactions which result in synthesis of said molecules.

18. The method for solid phase synthesis of molecules of Claim 16, wherein the ceramic surface material is selected from the group consisting of alumina, alumina silicate, aluminium oxide, aluminium nitride, berrylia, barium titanate, fused silica, silicon carbide, silicon nitride, boron nitride, boron carbide, silicon or boron carbonitride, titanium, titanium oxide, titanium boride, titanium carbide, hafnium, hafnium oxide, cerium, cerium oxide, zirconium, zirconium oxide, yttrium, yttrium oxide, zirconia-toughened alumina, and mixtures thereof.

19. The method for solid phase synthesis of molecules of Claim 16 or 17, wherein said molecules are selected from the group consisting of nucleic acids, oligosaccharides, polypeptides, and peptidomimetics.

20. The method for solid phase synthesis of molecules of Claim 16 or 17, wherein said molecules non-polymeric molecules selected from the group consisting of aromatic and heteroaromatic molecules, small molecules, and other drug-like molecules.

21. A method for solid phase synthesis of polypeptides or peptidomimetics using a porous ceramic solid support comprising the steps of:

(a) derivatizing ceramic surface material or a three-dimensional polymer network of said porous ceramic solid support with an amino functionality;

(b) attaching a linker compatible with used chemistry to said amino functionality and coupling a first amino acid or peptidomimetic moiety to said linker;

(c) coupling one or more additional amino acids or peptidomimetic moieties to said first amino acid or peptidomimetic moiety;

(d) cleaving the resulting elongated polypeptide chain or peptidomimetic product from the porous ceramic solid support; and

(e) purifying the resulting polypeptide or peptidomimetic product.

22. The method for solid phase synthesis of polypeptides or peptidomimetics of Claim 21, wherein the amino functionality is aminosilane.

23. A method for solid phase synthesis of polypeptides or peptidomimetics using a porous ceramic solid support comprising the steps of:

(a) derivatizing ceramic surface material or a three-dimensional polymer network of said porous ceramic solid support with a phenyl functionality;

(b) derivatizing the phenyl functionality to yield an appropriate functionality;

(c) coupling a compatible linker to said appropriate functionality and coupling a first amino acid or peptidomimetic moiety to said linker;

(d) coupling one or more additional amino acids or peptidomimetic moieties to said first amino acid or peptidomimetic moiety;

(e) cleaving the resulting elongated polypeptide chain or peptidomimetic product from the porous ceramic solid support; and

(f) purifying the resulting polypeptide or peptidomimetic product.

24. The method for solid phase synthesis of polypeptides or peptidomimetics of Claim 23, wherein the phenyl functionality is phenyltrichloro-methylsilane.

25. A combinatorial synthesis method for preparing aromatic and heteroaromatic compound libraries using a porous ceramic solid support comprising the steps of:

(a) functionalizing ceramic surface material of said porous ceramic solid support with one or more aromatic functionalities and compatable linkers;

(b) subjecting the aromatic functionalities to reactions which result in synthesis of said aromatic and heteroaromatic compounds; and

(c) cleaving and isolating the resulting compounds.

26. A combinatorial synthesis method for preparing aromatic and heteroaromatic compound libraries using a porous ceramic solid support, wherein said porous ceramic solid support comprises pore-filled ceramic particles, comprising the steps of:

(a) functionalizing a three-dimensional polymer network within interior channels of said pore-filled ceramic particles with one or more aromatic functionalities and compatible linkers;

(b) subjecting the aromatic functionalities to reactions which result in synthesis of said aromatic and heteroaromatic compounds; and

(c) cleaving and isolating the resulting compounds.

27. The combinatorial synthesis method of Claim 25 or 26, wherein the reactions of step (b) comprise one or more reactions selected from the group consisting of Friedel-Crafts alkylation with alkyl halides, alcohols, or alkenes in the presence of Lewis acids; Friedel-Crafts acylation with acid chlorides, or acid anhydrides; formulation of the arylaldehyde via the Vilsmeier reaction using

activated aromatic rings, dimethylformamide and phosphorus oxychloride; Michael addition; and transition metal mediated reactions.

28. The combinatorial synthesis method of Claim 27, wherein the transition metal mediated reaction is selected from the group consisting of Heck reaction, Stille coupling, and Suzuki reaction.

29. A method for generating combinatorial libraries of linkers using a porous ceramic solid support comprising the steps of:

(a) functionalizing ceramic particles of the porous ceramic solid support with chemical functionalities which permit the attachment of an organic molecule to said ceramic particles;

(b) attaching the organic molecule to said ceramic particles;

(c) subjecting the resulting attached organic molecule to reactions which result in synthesis of desired linkers;

(d) cleaving the desired linkers from the ceramic particles; and

(e) isolating the resulting linkers.

30. The method of generating combinatorial libraries of linkers of Claim 29, wherein said ceramic particles are pore-filled ceramic particles.

31. A porous ceramic support for use in solid phase synthesis which comprises inert, thermally and mechanically stable ceramic particles, wherein said particles are derivatized with one or more aromatic or heteroaromatic functionalities.

32. The porous ceramic support of Claim 31, wherein the ceramic particles comprise:

(a) a ceramic surface material having interior and exterior surfaces; and

(b) pores which permeate the interior of the ceramic particles.

33. The porous ceramic support of Claim 32, wherein said pores are substantially filled with a three-dimensional polymer network.

34. The porous ceramic support of Claim 33, wherein the aromatic or heteroaromatic functionalities derivatizing said ceramic particle are attached to the three-dimensional polymer network.